UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,736	06/01/2001	Yoshiro Shiokawa	109675	8493

25944 7590 10/30/2003

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
MOUTTET, BLAISE L	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 10/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/870,736	Applicant(s) SHIOKAWA ET AL.	
	Examiner Blaise L Mouttet	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-11 and 13-15* is/are rejected.

7)☒ Claim(s) *5,12 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

1. The replacement drawings were received on August 13, 2003. These drawings are acceptable.

Specification

2. Applicant's amendments to the specification have overcome the previously noted objections.

Claim Objections

3. Applicant's amendments to the claims have overcome the previously noted objections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4, 6, 8, 9, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. US 4,948,962 in view of Holkeboer et al. US 5,889,281.

Mitsui et al. discloses, regarding claims 1 and 2, a method of ion attachment mass spectrometry causing positively charged metal ions to attach to a gas to be detected in a reduced pressure atmosphere to ionize the gas for measurement of mass spectrometry (column 2, line 64 - column 3, line 5).

Mitsui et al. discloses, regarding claim 6, an apparatus for ion attachment mass spectrometry for measurement of mass spectrometry provided with:

a reaction chamber (2) for causing positively charged metal ions to attach to a gas to be detected (figure 1, column 5, lines 45-60);

a mass spectrometer (11) for separating and detecting said gas to which the positively charged metal ions are attached (figure 1, column 6, lines 9-16);

an analysis chamber in which said mass spectrometer (11) is placed (the housing for area 5 as illustrated in figure 1);

an introduction mechanism (as shown by the tubes carrying gases 16, 17 and 18 in figure 1) for introducing gases containing said gas to be detected into said reaction chamber (2) (column 5, lines 46-53);

an evacuation mechanism (13, 14, 15) for evacuating the gases containing said gas to be detected (figure 1, column 5, lines 63-65, column 6, lines 6-9);

a data processor (6, 12) for receiving and processing a mass signal from said mass spectrometer (11) (column 6, lines 4-7);

wherein the measurement of mass spectrometry on said gas to be detected is performed after causing the ions to attach to said gas to be detected to ionize it through said reaction chamber (2) and analysis chamber with a reduced pressure atmosphere (figure 1, column 5, line 45-65).

Regarding claim 8, differential evacuation chambers (3, 4) are provided between the reaction chamber (2) and analysis chamber for connecting the two chambers in a vacuum state (column 5, line 61 - column 6, line 4).

Mitsui et al. fails to disclose, regarding claims 1 and 2, a step of utilizing a property that sensitivity of each component of said gas has dependency on a total pressure of said reduced pressure atmosphere and that said dependency on the total pressure differs for each component and a step of performing a quantitative analysis while using the total pressure data of said reduced pressure atmosphere measured on mass spectrometry for processing of mass spectrometry data of each component and for setting measurement conditions.

Mitsui et al. fails to disclose, regarding claims 3, 9 and 13, that a quantitative value is calculated for each component using the sensitivity and mass signal.

Mitsui et al. fails to disclose, regarding claims 4 and 14, that the total pressure during measurement is set within an allowable fluctuation.

Mitsui et al. fails to disclose, regarding claim 6, a vacuum gauge for measuring a total pressure of the reduced pressure atmosphere wherein a total pressure signal from said vacuum gauge measured during the measurement is input to the data processor and said data processor includes a processing means for performing a quantitative analysis of each component utilizing the fact that sensitivity of said each component has dependency on the total pressure of said reduced pressure atmosphere and the dependency on total pressure differs for each component.

Holkeboer et al. discloses, regarding claims 1 and 2, a method of ion attachment mass spectrometry causing ions to attach to a gas to be detected in a reduced pressure atmosphere to ionize the gas for measurement of mass spectrometry (column 1, lines 10-12), comprising:

a step of utilizing a property that sensitivity of each component of said gas has dependency on a total pressure of said reduced pressure atmosphere and that said dependency on the total pressure differs for each component (as explained in relation to figure 2 the non-linearity of the sensitivity of the component gases with respect to total pressure are tested to establish data correction values), and

a step of performing a quantitative analysis while using the total pressure data of said reduced pressure atmosphere measured on mass spectrometry for processing of mass spectrometry data of each component and for setting measurement conditions (as explained in column 9, lines 2-34 in which the variation from linearity of the sensitivity of each gas component is quantified and corrected).

Holkeboer et al. discloses, regarding claims 3, 9 and 13, that a quantitative value (the respective correction values for the deviation from linearity of the sensitivity) is calculated for each component using the sensitivity and mass signal (column 9, lines 2-29).

Holkeboer et al. discloses, regarding claims 4 and 14, both a low and high pressure limit is set for the pressure fluctuation (column 8, lines 6-16).

Holkeboer et al. discloses, regarding claim 6, a vacuum gauge (30) for measuring a total pressure of said reduced pressure atmosphere (column 7, lines 63-65) wherein a total pressure signal from said vacuum gauge measured during the measurement is input to a data processor and the data processor includes a processing means (software as explained in column 2, lines 28-32) for performing a quantitative analysis of each component utilizing the fact that sensitivity of each component has dependency on the total pressure of said reduced pressure atmosphere and that the dependency on the total pressure differs for each gas component (as explained in column 9, lines 2-34 in which the variation from linearity of the sensitivity of each gas component is quantified and corrected).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize sensitivity/total pressure dependency in processing data and setting measurement conditions during quantitative analysis of the mass spectrometry data using the vacuum gauge and processing means as taught by Holkeboer et al. in the mass spectrometer of Mitsui et al.

The motivation for doing so would have been to counteract loss in measurement accuracy from ionic collisions, ion scattering and coulombic repulsion as taught by column 1, lines 32-52 of Holkeboer et al.

5. Claims 7, 10, 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Misui et al. US 4,948,962 in view of Mowry et al. US 5,962,774.

Mitsui et al. discloses, regarding claim 7, an apparatus for ion attachment mass spectrometry for measurement of mass spectrometry provided with:

a reaction chamber (2) for causing positively charged metal ions to attach to a gas to be detected (figure 1, column 5, lines 45-60);

a mass spectrometer (11) for separating and detecting said gas to which the positively charged metal ions are attached (figure 1, column 6, lines 9-16);

an analysis chamber in which said mass spectrometer (11) is placed (the housing for area 5 as illustrated in figure 1);

an introduction mechanism (as shown by the tubes carrying gases 16, 17 and 18 in figure 1) for introducing gases containing said gas to be detected into said reaction chamber (2) (column 5, lines 46-53);

an evacuation mechanism (13, 14, 15) for evacuating the gases containing said gas to be detected (figure 1, column 5, lines 63-65, column 6, lines 6-9);

a data processor (6, 12) for receiving and processing a mass signal from said mass spectrometer (11) (column 6, lines 4-7);

wherein the measurement of mass spectrometry on said gas to be detected is performed after causing the positively charged metal ions to attach to said gas to be detected to ionize it through said reaction chamber (2) and analysis chamber with a reduced pressure atmosphere (figure 1, column 5, line 45-65).

Regarding claim 15, differential evacuation chambers (3, 4) are provided between the reaction chamber (2) and analysis chamber for connecting the two chambers in a vacuum state (column 5, line 61 - column 6, line 4).

Mitsui et al. fails to disclose, regarding claim 7, a vacuum gauge for measuring a total pressure of the reduced pressure atmosphere wherein a total pressure signal from said vacuum gauge measured during the measurement is input to the introduction or evacuation mechanism and said data processor performs a quantitative analysis of each gas component.

Mitsui et al. fails to disclose, regarding claim 10, that the introduction or evacuation mechanism is controlled so that the total pressure is kept within an allowable fluctuation.

Mitsui et al. fails to disclose, regarding claim 11, that the data processor monitors total pressure fluctuation.

Mowry et al. discloses a mass spectrometer for performing quantitative analysis of gas components in which a vacuum gauge (54) for measuring a total pressure of a reduced pressure atmosphere of the mass spectrometer wherein a total pressure signal from said vacuum gauge measured during the measurement is input to an introduction

mechanism (48) wherein the total pressure fluctuation is monitored and kept within an allowable range by control of the introduction mechanism (48) (figure 1, abstract).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize the vacuum gauge as taught by Moery et al. to control the introduction mechanism of Mitsui et al. to maintain the total pressure within an allowable range.

The motivation for doing so would have been to perform real time recalibration during the analysis of gases using a mass spectrometer as taught by column 2, lines 39-58 of Mowry et al.

Additional Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Encyclopedia of Spectroscopy and Spectrometry pgs 1241-1248 provides historical background on mass spectroscopy.

Allowable Subject Matter

7. Claims 5, 12 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the indication of the allowability of claim 5 is the inclusion therein, in combination as currently claimed, of the step of calculating for each component of the gas the allowable fluctuation of total pressure using a rate of change of sensitivity corresponding to the total pressure during the measurement and a required quantitative error value. This limitation is found in claim 5 and is neither disclosed nor taught by the prior art of record, alone or in combination.

The primary reason for the indication of the allowability of claims 12 and 16 is the inclusion therein, in combination as currently claimed, of a processor for calculating for each component of the gas the allowable fluctuation of total pressure using a rate of change of sensitivity corresponding to the total pressure during the measurement and a required quantitative error value. This limitation is found in claims 12 and 16 and is neither disclosed nor taught by the prior art of record, alone or in combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

8. Applicant's arguments filed August 13, 2003 have been fully considered but they are not persuasive.

The applicant's arguments appear to be as follows:

a) None of the prior art utilized discloses an ion attachment mass spectrometer.

b) The definition of an ion attachment mass spectrometer must include the production of ions having the formula [Sample]Metal+.

c) It is not obvious to combine the reference utilized because they each teach different types of mass spectrometers.

In response to applicant's first argument the examiner notes the historical discussion of mass spectrometry in the Encyclopedia of Spectroscopy and Spectrometry cited in the current action. This provides evidence that all mass spectrometers involve ion attachment of some type. Furthermore the examiner notes that plasma, as cited in the Mitsui et al. reference, is defined (see any dictionary) as a collection of charged particles containing ions and electrons. Therefore based upon the claim language there is no adequate reason to distinguish applicant's ion attachment spectrometer from the spectrometers of the applied references.

In response to applicant's second argument it is noted that this limitation is not a claimed feature and it does not appear to be a feature uniquely defined in the specification so that one of ordinary skill would know that the claims are so limiting.

In response to applicant's third argument the examiner notes that one of ordinary skill would be aware of all types of mass spectrometers and making a combination between two different types would not be beyond ordinary skill unless such a combination would produce detrimental or adverse effects. The applicant has not argued or provided evidence for any such detrimental effects of the proposed combination and the examiner has noted motivation for such combination that was present to one of ordinary skill at the time of the invention.

The examiner maintains the rejections of the claims made under 35 USC 103a as in the prior and current action.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet whose telephone number is (703) 305-3007. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier, Art Unit 2853, can be reached at (703) 308-4896. The fax

phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet October 20, 2003

BM 10/20/2003

Stephen D. Meier
Primary Examiner